A1 concl'd

the direction of the opto-mechanical scan. Without this provision, the pixels in the image will be blurred in the cross-scan direction. Also according to the ideal case, the angular scan speeds of the LOS due to the electronic scan and the optical rate and the scan rates must be also equal. Without this provision, the pixels will be blurred in the along-scan direction. If both of these conditions are satisfied, then the outputs from the array will have the angular resolution as a single detector element but an effective dwell time per pixel equal to N times the integration period of a single cycle, where N is the number of columns summed in the TDI (N=4 in the illustrated example).

Amend the paragraph at lines 12-20 of page 11 to read as follows:

A2

Between these arcs, the orientation of this inner axis is offset by rotation about the outer gimbal axis. The outer gimbal needs only to be capable of holding a small number of fixed positions, with the mechanical angle between positions no greater than one-half of the optical width (cross-scan) of the scanned arcs. These factors tend to simplify the apparatus required to measure and control the rotational angle of the outer axis. The position of the outer gimbal must be known to the same level of

A

A2.0 concl'd

accuracy as that of the inner gimbal, however. The angular velocity of the mechanical scan is held constant during any given arc. However it is preferable to change the angular velocity from arc-to-arc, in order to maintain the same optical scan rate for each arc.

Amend the paragraph at line 18 of page 12 through line 6 of page 13 to read as follows:

A3

Some of the above objects are achieved by a method of scanning a field of view of an imager across a field of regard using a scan mirror mounted on a gimbal having an inner axis and an outer axis. The method includes sweeping the field of view across the field of regard in a selected direction by rotating the gimbal about the inner axis while maintaining the gimbal at a fixed angle with respect to the outer axis. The method further includes progressing to a subsequent scan position by rotating the gimbal about the outer axis by a predetermined increment angle while maintaining the gimbal at a fixed angle with respect the inner axis. Additionally, the method includes repeating the act of sweeping such that the selected direction is chosen alternately from a first direction and a second direction that is opposed to the first direction. The method further includes repeating the act of progressing prior to each repeated act of

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A

A3 concl'd

sweeping, wherein there is substantially no rotation, with respect to the instantaneous direction of scan, of an image formed on the imager.

Amend the paragraph at line 21 of page 17 through line 5 of page 18 to read as follows:

A4

Reference measurements are made at the beginning and the end of each arc, while the LOS is pointing to space. The reflection angle from the scan mirror reaches a minimum at the center of each arc in the FOR. It exhibits only a slow, quadratic increase towards each end of the arc (the eastern and western sides of the Earth's disk) as the scan mirror is rotated about the inner gimbal's axis. The large variations in scan angle occur between arcs rather than within an arc. In this geosynchronous imager embodiment, measurements of dark space are used as references to subtract the instrument's background from the raw signals. The time interval between reference and scene measurements is short, minimizing degradations caused by thermal drifts and 1/f noise.

Amend the paragraph at line 10 of page 26 through line 2 of page 27 to read as follows:

A5

In the thermal IR channels, each mirror in the optical train emits background radiation that contributes to all signals

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A

A5 conc 1.0

measured by the detectors. This background from each optical element is proportional to its emissivity and increases with temperature according to Planck's law. Space looks, taken at the ends of each scan line when looking past the Earth into space, are used to measure the dark current due to instrumental background. This background is then subtracted from the raw scene data to determine the net radiance from the Earth. All components of the background due to thermal radiation from within the instrument are properly subtracted from the signal whenever they remain constant during a single scan line. All optical elements have temperatures that remain virtually constant during a single scan line, and all except the scan mirror **818** reflect the radiation from the scene in a fixed orientation, so their emissivities also remain constant. The scan mirror **818**, however, reflects radiation at a variable angle over the course of a scan line. When the scan mirror's emissivity varies as a function of the reflection angle, it creates a bias in this background subtraction process that is proportional to the difference in emissivity between the reflection angle of the scene measurement and that of the background measurement. Therefore, variation in the reflection angle within a scan line is more troublesome that variation in the reflection angle from line to line.

Amend the paragraph at lines 8-12 of page 34 to read as follows:

A6

Referring to Fig. 12, a bi-directional scan pattern **1210** for mapping the full Earth disk that is generated by the system of Fig. 11 is illustrated. Comparing the scan pattern of Fig. 12, with that of Fig. 7, the arcs in Fig. 12 are more nearly straight lines. This is yet another way of characterizing that image rotation is reduced according to this preferred embodiment.

54

A